STARS ACADEMY LAHORE

MULTAN CAMPUS

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STARS ENTRY TEST SYSTEM-2019

MDCAT (CRASH PROGRAM)

Test Code: CRASH 11 **Time Allowed: 150 mins**

BIOLOGY

1. **Cardiac muscles are:**
   A) Voluntary B) Involuntary C) Both a and b D) None of the above
2. **The thick filament which are 16 mm in diameter are composed of:**
   A) Actin B) Myosin C) Tropomyosin D) Troponin
3. **Muscle fatigue is caused by:**
   A) CO2 B) Accumulation of lactic acid C) Fumaric acid D) Ethyl alcohol
4. **Brachioradialis causes the uplift of:**
   A) Radius B) Ulna C) Both a and b D) Humerus
5. **Thin filament in myofibrils consists of:**
   A) Actin, tropomyosin, troponin B) Z line C) Myosin D) Sarcomere
6. **The contraction of striated muscle is initiated by the release of energy in the presence of:**
   A) Acetyl choline B) Calcium ion C) Chloride ion D) Iron
7. **Which of the following changes occur when skeletal muscle contracts:**
   A) The A band shorten C) The Z-line slide farther apart
   B) The I band shorten D) The actin filament contract
8. **Which of these is a direct source of energy for muscle contraction?**
   A) ATP B) Lactic acid C) Creatine phosphate D) Both a and b
9. **When muscle contracts:**
   A) Sarcomeres increases in size C) Lactic acid is produced
   B) Myosin slides past actin D) Both a and b
10. **Which is the end of muscle which remains fixed when muscles contracts?**
    A) Insertion B) Origin C) Tendon D) Belly
11. **Muscle is connected to bone by:**
    A) Tendon B) Ligament C) Z-line D) Cross briges
12. **Tetanus is caused by:**
    A) Bacteria B) Virus C) Fungi D) Clostridium tetani
13. **Skeletal muscle fibers have diameter:**
    A) 100-200 µ B) 10-100 µ C) 10-100 nm D) 100-1000 µ
14. **Muscles in the Gut Wall are:**
    A) Smooth B) Skeletal C) Cardiac D) Voluntary
15. **Which of the following muscle straightens the Elbow Joint:**
    A) Brachialis B) Triceps C) Biceps D) Brachioradialis
16. **Slightly elastic connective tissues that attach bone to bone are called:**
    A) Tendons B) Brachialis C) Brachioradialis D) Ligament
17. **Skeletal muscles are called striated (stripped) because of presence of:**
    A) Red and Yellow band C) Alternating light and dark band
    B) White and Yellow band D) Red and black band
18. **The earliest form of muscles to evolve is:**
    A) Cardiac muscles B) Skeletal muscles C) Smooth muscles D) Involuntary muscles
19. **Each musle fiber is surrounded by a membrane which is called:**
    A) Sarcomere B) Sarcolemma C) Twitch fiber D) Capsule
20. **Which disease is caused by low calcium in the blood?**
    A) Tetany B) Cramp C) Muscle fatigue D) Sciatica
21. **When calcium ions are released from the sarcoplasmic reticulum they bind with --------- during muscle contraction:**
    A) Tropomyosin B) Sarcomere C) Cytosol's ions D) Troponin
22. **Which one is most common in thigh and hip muscles:**
    A) Muscle fatigue B) Tetany C) Cramp D) Tetanus

23. The length of myofibril from one Z-band to the next is described as
A) Sarcolemma B) Sarcoplasm C) Sarcomere D) Muscle fiber

24. Where we find H zone in the figure of fine structure of skeletal muscle's myofibril?
A) In the mid of A band B) In I band C) Besides the Z-line D) Along the I band

25. The repeated protein pattern of myofibrils is called:
A) Sarcomere B) Telomere C) Sarcolemma D) Cross bridges

26. Which of the following changes occur during skeletal muscles contraction:?
A) I-band shortens only
B) A-band shortens and Z-lines move apart
C) I-band shortens and Z-lines come close to each other
D) Actin filaments contract

27. The sarcolemma of muscle fiber folds inwards and forms a system of tubes which runs through the sarcoplasm called:
A) Myofilaments B) Sarcoplasmic reticulum C) Z-lines D) Transverse tubules

28. ------- cells survive for a few days and secrete a huge number of antibodies in blood tissue fluids or lymph:
A) Memory cells B) B-lymphocytes C) T-lymphocyte D) Plasma cells

29. The protection from snake bite can be obtained by:
A) Active immunity B) Natural active immunity C) Pasive immunity D) Vaccination

30. The antibody molecule consists of ------------ polypeptide chains
A) Eight B) Four C) Six D) Two

31. Variable amino acid sequences in antibody molecule are found in:
A) Both light chains only C) One heavy chain and one light chain
B) Both heavy chains only D) Both heavy and light chains

32. To combat the active infections of tetanus, rabies and snakes the ------- method of immunization is used:
A) Active B) Humoral C) Active Artificial D) Passive

33. The type of immunity in which antibodies are passed from one individual to another is called:
A) Passive Immunity C) Natural Active Immunity
B) Artificial Active Immunity D) Humoral Immunity

34. B-cells release antibodies in blood plasma, tissue fluid and lymph. This kind of immune response is called:
A) Cell Mediated Response B) Humoral Response C) Active Response D) Compound Response

35. B-lymphocytes are named due to their relationship with:
A) Blood B) Bursa of Fabricius C) Bone marrow D) Bile duct

36. Passive immunity is used against:
A) Malaria B) Typhoid C) Dengue D) Tetanus

37. Which one of the following gland is involved in the maturation of lymphocytes?
A) Pineal B) Pituitary C) Thymus D) Adrenal

38. Which type of immunity is achieved by injecting antibodies, antiserum, anti-venom serum?
A) Active immunity C) Artificially induced immunity
B) Passive immunity D) Naturally induced immunity

39. T-lymphocytes recognize antigen and pathogens or transplanted organ and tissues. This effect is called:
A) Cell-mediated response B) Humoral response C) Active Immunity D) Passive immunity

40. Which part of antibody recognizes the antigen during immune response?
A) Heavy part B) Light part C) Constant part D) Variable part

41. Two identical light chains and two identical heavy chains in antibody molecule are linked by:
A) Disulphide bridges B) Peptide bond C) Glycerol bond D) Ionic bond

42. Antibodies are produced against invading cells by:
A) Lymphocytes B) Basophils C) Basophils D) Neutrophils

43. In the structural diagram of an antibody molecule which portion is occupied by variable chains?
A) Lower portion B) Upper portion C) Middle portion D)In between chains

44. In passive immunity which of the following components are injected into body?
A) Antigens B) Immunogens C) Serum D) Immunoglobulins

45. Antigen is a foreign or any other molecule which stimulates the formation of :
A) NHC complex B)Immunogen C) Mucus D) Antibodies

46. Skin and mucus membranes are part of the body defense system and they form the:

A) Physical barriers B) Mechanical barriers C) Chemical barriers D)Biological barriers

47. The antibodies provided to infant through mother's milk is an example of

A) Natural passive immunity C) Natural active immunity
B) Artificial passive immunity D) Artifcial active immunity

48. Which of the following is described as vaccination:

A) Artificial active immunity C) Artificial passive immunity
B) Natural active immunity D) Natural passive immunity

49. The chemical nature of antibody is:

A) Glycoprotein B) Glycolipids C) Lipoproteins D) Polysaccharide

50. At the start of a muscle contraction, calcium ions are released from:

A) Acting. C) The motor neuron.
B) The T tubule. D) The sarcoplasmic reticulum.

51. The "Insertion" is attached to the:

A) Moveable bone B) Immoveable bone C) Porous bone D) Compact bone

52. Diameter of a myofibril is

A) 1 – 2 μm B) 10 – 100 μm C) 7 – 8 μm D) 16 μm

53. Twisting around the actin chains are two strands of another protein:

A) Troponin B) Tropomyosin C) Myosin D) Collagen

54. There is a regular alteration of light and dark bands called the ______ respectively:

A) I – band and A – band C) M – line and A – band
B) A – band and I – band D) Z – line and I – band

55. Myofibril consists of many thread like structures called:

A) Actin filaments C) Myofilaments
B) Myosin filaments D) Intermediate filaments

56. The special contractile protein actin is found in

A) Thick filaments of A – bands C) Both thick and thin bands
B) Thin filaments of I – bands D) Whole of myofibril

57. Which statement is correct for muscle contraction?

A) Length of H – zone is decreased C) Length of I – band gets increased
B) Length of A – band remains constant D) Length of two Z – line get increased

58. Troponin is a

A) Digestive enzyme C) High energy reservoir
B) Muscle protein D) Water soluble vitamin

59. During the muscle contraction which zone disappear

A) I – zone B) Z – zone C) H – zone D) M – zone

60. The light bands (I – bands) of a skeletal muscles are known as

A) Isotropic bands B) Anisotropic bands C) Intercalated disc D) Cross bridges

61. In the resting muscle fibre, tropomyosin partially covers

A) Calcium binding sites on troponin C) Myosin binding sites on actin
B) Actin binding sites on myosin D) Calcium binding sites on actin.

62. Cardiac muscle is characterized by

A) Striated appearance B) Involuntary control C) Branching pattern D) All of these

63. The dark bands (A – bands) of a skeletal muscle are known as

A) Isotropic bands B) Anisotropic bands C) Intercalated disc D) Cross bridges

64. During muscle contraction,

A) Chemical energy is changed into electrical energy
B) Chemical energy is changed into mechanical energy
C) Chemical energy is changed into physical energy
D) Mechanical energy is changed into chemical energy

65. The H – zone in the skeletal muscles fibre is due to

A) The absence of myofibrils in the central portion of A – band.
B) The central gap between myosin filaments in the A – band.
C) The central gap between actin filaments extending through myosin filaments in the A – band.
D) Extension of myosin filaments in the central portion of the A – band.

66. An antibody is a

A) White corpuscle, which attacks invading bacteria
B) Molecule that specifically inactivate an antigen
C) Component of the blood
D) Secretion of mammalian erythrocyte

67. Which of the following is related to humoral immunity?

A) T – Lymphocyte B) I – Lymphocyte C) B – Lymphocyte D) P – Lymphocyte

68. Colostrum provides the infant with:

A) Auto immunity B) Active immunity C) Passive immunity D) Innate immunity

69. Immunoglobulin's are produced and employed to work. These are:
A) Produced by B cells and are present on the surface of the RBCs
B) Produced by B cells and are present in blood serum
C) Produced by T cells and are present in blood serum
D) Produced by T cells and are present on the surface of the RBCs

70. The binding of antibodies to the antigens to produce a large insoluble complex is known as:
A) Antibody – antigen complex   C) Immunization
B) Agglutination   D) Suppressor cell reaction
71. A person is injected with globulin against hepatitis.
A) Artificially acquired passive immunity   C) Naturally acquired active immunity
B) Artificially acquired active immunity   D) Naturally acquired passive immunity
72. Passive immunity is defined as immunity:
A) Inherited from the parents
B) Achieved through vaccination
C) Acquired through first exposure to the disease
D) Achieved through the sera of other animals enriched in anitbodies
73. Antigen binding site in an antibody is found between:
A) Two light chains
B) Two heavy chains
C) One heavy and one light chain
D) Either between two light chains or between one heavy and one light chain depending upon the nature of antigen.
74. Passive immune response is:
A) Long lasting   B) Delayed   C) Immediate   D) Persistent
75. Antibodies consists of:
A) 2 light chains and 2 heavy chains arranged in a Y-shaped configuration
B) A light chain and 2 heavy chains arranged in a Y-shaped configuration
C) 2 light chains and a heavy chain arranged in a Y-shaped configuration
D) all of these
76. The immunity in which T cells recognize the antigens or microorganisms is known as:
A) Tissue Grafting   C) Cell Mediated Immunity / Response
B) Phagocytosis   D) Hormonal Immunity / Response
77. Capacity to recognize intrusion of any foreign body is called
A) Transport   B) Immunity   C) Lymphatic system   D) Inhibition
78. These are not immunoglobulins
A) Antibodies   B) Lymphocytes   C) platelets   D) Both b & c
79. How many disulphide bridges are found in heavy chains
A) 1   B) 3   C) 2   D) 4
80. Plasma cell clone formed by
A) B-lymphocytes   B) T-lymphocytes   C) Neutrophils   D) Both a & b

CHEMISTRY

81. In which of the following conversions, phosphorus pentachloride is used as the reagent?
A) $H_2C{=}CH_2 \rightarrow CH_3CH_2Cl$ C) $CH_3CH_2OH \rightarrow CH_3CH_2Cl$
B) $CH{\equiv}CH \rightarrow CH_2{=}CHCl$ D) Both A & B
82. Alkyl halides on heating with dry Ag_2O yield :
A) esters   B) ketones   C) ethers   D) AgCl + hydrocarbon
83. C – X bond is strongest in
A) CH_3Cl B) CH_3F C) CH_3Br D) CH_3I
84. C – Cl bond of chlorobenzene in comparison to C – Cl bond in methyl chloride is
A) longer and weaker   C) shorter and weaker
B) shorter and stronger   D) longer and stronger
85. Ethyl bromide reacts with lead-sodium alloy to form
A) tetraethyl lead   C) Both (a) & (b)
B) tetramethyl bromide   D) None of these
86. Which of the following alkyl halides is used as a methylating agent?
A) C_2H_5Br B) CH_3I C) C_6H_5Cl D) C_2H_5Cl
87. Which of the following reactions is an example of nucleophilic substitution reaction?
A) $2\,RX + 2\,Na \rightarrow R-R + 2\,NaX$ C) $RX + H_2 \rightarrow RH + HX$
B) $RX + Mg \rightarrow RMgX$ D) $RX + KOH \rightarrow ROH + KX$
88. Tertiary alkyl halides are practically inert to substitution by S_N2 mechanism because of

A) steric hindrance   C) Electron withdrwaing inductive effect of alkyl groups
B) instability   D) insolubility

89. The function of anhydrous $AlCl_3$ in Friedel Crafts reaction is to:
A) absorb water   C) produce electrophile
B) absorb HCl   D) produce nucleophile

90. How many different di-substitution products are possible, when a mixture of bromine and ethane is allowed to react in the presence of sunlight?
A) 3   B) 7   C) 5   D) 2

91. The substance that would not be formed during the reaction of methane and chlorine in presence of sunlight:
A) CH_3Cl B) $CHCl_3$ C) CH_3CH_3 D) $CH_3CH_2CH_3$

92. 1,2-dibromo-3-chloropropane (DBCP) has been used in the control of earthworms in agricultural land is prepared by:
A) $CH_3CH_2CH_2Cl + 2Br_2 \rightarrow$ DBCP + 2HBr   C) $CH_2{=}\,CHCH_2Cl + Br_2 \rightarrow$ DBCP
B) $CH_3CHBrCH_2Br + Cl_2 \rightarrow$ DBCP + HCl   D) $ClCH_2CH{=}CH_2 + PBr_5 \rightarrow$ DBCP + PBr_3

93. Identify tertiary RX from the following compounds:
A) Neo-pentyl chloride   C) n-butyl chloride
B) 2-chloro-2-methylpropane   D) Sec-propyl chloride

94. Which of the following alkyl halides undergoes elimination reaction readily
A) RI   B) R–Cl   C) R–Br   D) R–F

95. Which of the following alkyl halides undergo S_N1 reaction at the fastest rate?
A) CH_3Cl B) Isobutyl chloride   C) C_2H_5Cl D) t-butyl chloride

96. Thionyl chloride reacts with monohydric alcohols to gives:
A) alkyl halides   B) chloro alkanes   C) haloalkanes   D) halogenoalkanes

97. If alkyl halide is optically active, S_N1 reaction leads to:
A) Racemization   B) Retention   C) Inversion   D) Resolution

98. Butannitrile is formed by reaction of KCN with:
A) Propyl alcohol   B) Butyl alcohol   C) Butyl chloride   D) n-Propyl chloride

99. In alkaline hydrolysis of a tertiary halide by aqueous alkali if concentration of alkali is doubled, then the reaction rate
A) Will be doubled   C) Will have halved
B) Will remain constant   D) Can't say

100. Reagent not used to prepare an alkyl halide from an alcohol is
A) HCl + $ZnCl_2$ B) PCl_5 C) NaCl   D) $SOCl_2$

101. Chloroform can be used as
A) Antipyretic & Antiseptic   C) Insecticide, Antihistamine
B) anaesthetic & Industrial solvent   D) Fire extinguisher

102. Among the halogen derivatives of ethane, the one which has the highest boiling point is
A) C_2H_5F B) C_2H_5Br C) C_2H_5Cl D) C_2H_5I

103. Which of the following reagent will replace –OH group of alcohol by a halogen atom
A) HOCl   B) $SOCl_2$ C) Br_2 D) I_2

104. IUPAC name of $CHF_2{-}CCl_3$
A) 1,1-difluoro,-2,2,2-trichloroethane   C) 1,1-Trifluoro,-2,2-dichloroethane
B) 1,1,1-trichloro-2,2-difluoroethane   D) 2,2-Difluoro,-3,3,3-trichloroethane

105. Bond energy of C–Br bond is
A) 467 KJ mol^{-1} C) 346 KJ mol^{-1}
B) 413 KJ mol^{-1} D) 290 KJ mol^{-1}

106. In nucleophilic substitution bimolecular reaction the order of reaction with respect to substrate
A) 2nd order   B) 3rd order   C) 1st order   D) Zero order

107. Rate of S_N1 reaction depends upon conc. of
A) Catalyst   C) Leaving group
B) Attacking nucleophile   D) Substrate

108. When an Alkyl halide reacts with excess of ammonia the major product is?
A) Primary Amine   C) Tertiary amine
B) Secondary amine   D) Quaternary ammonium halide

109. The rate of E1 reaction depends upon
A) The concentration of substrate   C) The concentration of substrate as well as nucleophile
B) the concentration of nucleophile   D) 2nd step

110. Reduction of alkyl halides give
A) Alkanes   B) Alkenes   C) Ketones   D) Ether

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111. **Each of the following compounds is effective as refrigerant. The release of which one of these causes the greatest depletion of the ozone layer**

A) CCl_2F_2 C) CH_3CHF_2

B) CH_3OCH_3 D) $CH_3CH_2CH_3$

112. **Which statement about these steps are correct** $C_2H_5Br \xrightarrow{step1} C_2H_5OH \xrightarrow{step\ 2} C_2H_5Cl$

A) Step 1 uses alcoholic KOH C) Step 2 uses hot aqueous $NaCl$

B) Step 1 involves a nucleophilic substitution D) Step 2 is electrophilic substitution

113. **Which halide is hydrolyzed faster**

A) CH_3CH_2F B) CH_3CH_2Cl C) CH_3CH_2Br D) CH_3CH_2I

114. **Thionyl chloride reacts with alcohol to form alkyl halide reaction takes place in the presence of**

A) Zinc chloride B) Pyridine C) Aniline D) ThO_2

115. **Statement correct about Nucleophillic substitution bimolecular is**

A) Transition state is formed C) It is two step reaction

B) No Inversion takes place D) Rate is independent of substrate

116. **Halogenoalkanes can be produced by addition of halogen in all except**

A) $CH_2 = CH_2$ C) $CH \equiv CH$

B) $CH_3CH = CH_2$ D) CH_3-CH_3

117. **An environmental pollutant affects the quality of life and the natural functioning of ecosystem. Which of the following is not an environmental pollutant**

A) CO B) NO C) NO_2 D) CO_2

118. **Tertiary butyl chloride reacts with aqueous KOH the reaction follows**

A) S_N1 mechanism C) E1 mechanism

B) S_N2 mechanism D) E2 mechanism

119. **All are secondary pollutants except one that is:**

A) Ozone B) PAN C) Ammonia D) H_2SO_4

120. **Which one could be prepared by reacting bromoethane with potassium cyanide and then reducing the product?**

A) $CH_3 – CH_3$ C) $CH_3CH_2CH_3$

B) CH_3CH_3 N H_2 D) $CH_3CH_2CH_2$N H_2

121. **Ozone can be beneficial because it can?**

A) be used as disinfectant C) cause lung discomfort

B) produce eye discomfort D) retard plant growth

122. **Which of the following is not true for S_N1 reactions?**

A) They occur through single step reaction

B) They are favored by polar solvent

C) Tertiary alkyl halides generally react through this mechanism

D) Concentration of Nucleophile does not affect the rate of such reactions

123. **Which one is wrong statement:**

A) An electrophile may be neutral

B) A nucleophile may be neutral

C) Br^- ion is a good leaving group and OH^- is poor leaving group

D) Iodide ion is a bad leaving group but a good nucleophile

124. **In elimination bimolecular reactions base attack on.**

A) $\alpha - carbon$ C) $\alpha - Hydrogen$

B) $\beta - carbon$ D) $\beta - Hydrogen$

125. **In which process alkene is produced:**

A) Reaction of ethyl chloride with alcoholic KOH

B) Reaction of ethyl chloride with nascent hydrogen

C) Reaction of ethyl chloride with aqueous KOH

D) Reaction of ethyl chloride with sodium metal

126. **Isopropychloride and n-propylchloride are:**

A) Position isomers C) Chain isomers

B) Functional isomers D) Metamers

127. **IUPAC Name of the compound $(CH_3CH_2)_2CHBr$**

A) Diethyl bromo methane C) 1,1–diethylbromo methane

B) 3–bromopentane D) 3–ethyl–3–bromo propane

128. **Alkyl halides react with ammonia to form amines. If alkyl halide is in excess, then the major product formed will be?**

A) Quaternary alkyl ammonium salts C) Tertiary amine
B) Secondary amine D) Primary amine

129. Which one is not a nucleophile?
A) BH_3 B) RNH_2 C) RSH D) R_2O

130. Reducing smog contains high concentration of:
A) NO_2 B) NO C) SO_2 D) N_2O

131. Acid rain is caused by increase in the atmospheric concentration of?
A) Ozone and dust B) SOz and NOx C) SOz and COx D) CO_2 and Ox

132. Which of the following statements is incorrect in relation to checking and controlling acid rains?
A) Catalytic converters are installed in cars
B) Expensive scrubbers are installed in industries and thermal power stations
C) Use of diesel cars is promoted by discouraging the use of petrol cars
D) All are incorrect

133. The ultraviolet radiations in the stratosphere are absorbed by:
A) Oxygen B) Ozone C) Sulphur dioxide D) Argon

134. What is the mean residence time of NO_2 in the atmosphere?
A) 3-7 Years B) 3 days C) 2 days D) 4 days

135. The gases present in trace amount in the atmosphere is?
A) He B) Ne C) Ar D) Both A & B

136. Which of the following is a primary pollutant?
A) CO B) CO_2 C) O_3 D) HF

137. Fuels Burning in various type of transportation contribute ----------- of CO in the atmosphere.
A) 50% B) 25% C) 0.03% D) 75%

138. The region in which ozone depletes substantially every year is termed as?
A) Black hole C) Ozone hole
B) Bermuda triangle D) Aurora

139. Natural sources of CO does not include?
A) Lightening C) Oxidation of methane in the atmosphere
B) Volcanic eruptions D) Natural gas emissions

140. ------------ gas is produced when chlorine free (Cl•) radical reacts with O_3?
A) CF_2Cl_2 B) Cl_2 C) O_2 D) Cl_2O

PHYSICS

141. The material which practically does not show elastic after effect is
A) Copper B) Rubber C) Steel D) Quartz

142. If the temperature increases, the modulus of elasticity
A) Decreases B) Increases C) Remains constant D) Becomes zero

143. force *F* is needed to break a copper wire having radius *R*. The force needed to break a copper wire of radius 2*R* will be
A) *F*/2 B) 2*F* C) 4*F* D) *F*/4

144. The diameter of a brass rod is 4 *mm* and Young's modulus of brass is $9\times10^{10}\ N/m^2$. The force required to stretch by 0.1% of its length is
A) $360\ \pi N$ B) 36 *N* C) $144\pi\times10^3\ N$ D) $36\pi\times10^5\ N$

145. If *x* longitudinal strain is produced in a wire of Young's modulus *y*, then energy stored in the material of the wire per unit volume is
A) yx^2 B) $2yx^2$ C) $\frac{1}{2}y^2x$ D) $\frac{1}{2}yx^2$

146. In a wire of length *L*, the increase in its length is *l*. If the length is reduced to half, the increase in its length will be
A) *l* B) 2*l* C) $\frac{l}{2}$ D) 3l

147. *A* and *B* are two wires. The radius of *A* is twice that of *B*. They are stretched by the some load. Then the stress on *B* is
A) Equal to that on *A* B) Four times that on *A* C) Two times that on *A* D) Half that on *A*

148. Why the spring is made up of steel in comparison of copper
A) Copper is more costly than steel C) Steel is more elastic than copper
B) Copper is more elastic than steel D) None of the above

149. Two wires of copper having the length in the ratio 4 : 1 and their radii ratio as 1 : 4 are stretched by the same force. The ratio of longitudinal strain in the two will be

A) 1 : 16 B) 16 : 1 C) 1 : 64 D) 64 : 1

150. A steel wire is stretched with a definite load. If the Young's modulus of the wire is *Y*. For decreasing the value of *Y*

A) Radius is to be decreased C) Length is to be increased

B) Radius is to be increased D) None of the above

151. The interatomic distance for a metal is $3 \times 10^{-10}\, m$. If the interatomic force constant is $3.6 \times 10^{-9}\, N / \AA$, then the Young's modulus in N/m^2 will be

A) 1.2×10^{11} B) 4.2×10^{11} C) 10.8×10^{-19} D) 2.4×10^{10}

152. The longitudinal strain is only possible in

A) Gases B) Fluids C) Solids D) Liquids

153. If the density of the material increases, the value of Young's modulus

A) Increases C) First increases then decreases

B) Decreases D) First decreases then increases

154. The quality of the material which opposes the change in shape, volume or length is called

A) Intermolecular repulsion C) Viscosity

B) Intermolecular behaviour D) Elasticity

155. The force required to stretch a steel wire of $1\, cm^2$ cross-section to 1.1 times its length would be $(Y = 2 \times 10^{11}\, Nm^{-2})$

A) $2 \times 10^{6}\, N$ B) $2 \times 10^{3}\, N$ C) $2 \times 10^{-6}\, N$ D) $2 \times 10^{-7}\, N$

156. Which one of the following quantities does not have the unit of force per unit area

A) Stress B) Strain C) Young's modulus of elasticity D) Pressure

157. In which case there is maximum extension in the wire, if same force is applied on each wire

A) *L* = 500 *cm*, *d* = 0.05 *mm* C) L = 300 *cm*, *d* = 0.03 *mm*

B) L = 200 *cm*, *d* = 0.02 *mm* D) *L* = 400 *cm*, *d* = 0.01 *mm*

158. According to Hook's law of elasticity, if stress is increased, the ratio of stress to strain

A) Increases C) Decreases

B) Becomes zero D) Remains constant

159. Two wires of same diameter of the same material having the length *l* and 2*l*. If the force F is applied on each, the ratio of the work done in the two wires will be

A) 1 : 2 B) 1 : 4 C) 2 : 1 D) 1 : 1

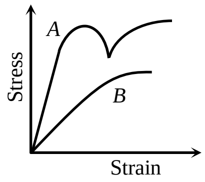
160. The diagram shows stress *v/s* strain curve for the materials *A* and *B*. From the curves we infer that

A) *A* is brittle but *B* is ductile

B) *A* is ductile and *B* is brittle

C) Both *A* and *B* are ductile

D) Both *A* and *B* are brittle



161. The energy band gap of Si is

A) $0.70\, eV$ B) 1.1 *eV* C) Between $0.70\, eV$ to $1.1\, eV$ D) 5 *eV*

162. The forbidden energy band gap in conductors, semiconductors and insulators are EG_1, EG_2 and EG_3 respectively. The relation among them is

A) $EG_1 = EG_2 = EG_3$ C) $EG_1 < EG_2 < EG_3$

B) $EG_1 > EG_2 > EG_3$ D) $EG_1 < EG_2 > EG_3$

163. Energy bands in solids are a consequence of

A) Ohm's Law C) Bohr's theory

B) Pauli's exclusion principle D) Heisenberg's uncertainty principle

164. The electrical circuit used to get smooth dc output from a rectifier circuit is called

A) Oscillator B) Filter C) Amplifier D) Logic gates

165. The reverse biasing in a PN junction diode

A) Decreases the potential barrier

B) Increases the number of minority charge carriers

C) Increases the potential barrier

D) Increases the number of majority charge carriers

166. The reason of current flow in P-N junction in forward bias is mainly due to

A)Drifting of charge carriers

B)Diffusion of charge carriers

C) Minority charge carriers

D) All of these

167. In comparison to a half wave rectifier, the full wave rectifier gives lower

A) Efficiency

B) Average output voltage

C) Average dc

D) None of these

168. When forward bias is applied to a P-N junction, then what happens to the potential barrier VB, and the width of charge depleted region x

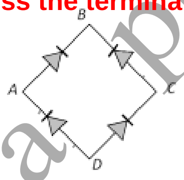
A) VB increases, x decreases

B) VB increases, x increases

C) VB decreases, x increases

D) VB decreases, x decreases

169. In the diagram, the input is across the terminals A and C and the output is across the terminals B and D, then the output is



A) Zero

B) Full wave rectifier

C) Same as input

D) Half wave rectifier

170. If a full wave rectifier circuit is operating from 50 Hz mains, the fundamental frequency in the ripple will be

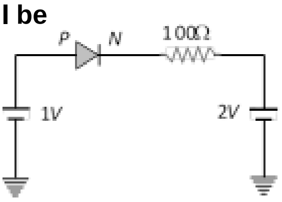
A) 50 Hz

B) 100 Hz

C) 70.7 Hz

D) 25 Hz

171. The current through an ideal PN-junction shown in the following circuit diagram will be



A) Zero

B) 1 mA

C) 10 mA

D) 30 mA

172. Of the values listed, the most realistic value for open-loop voltage gain of an OP-amp is ……

A) 1

B) 2000

C) 80 dB

D) 100,000

173. For an Op-amp with negative feedback, the output is …….

A) equal to the input

B) increased

C) fed back to the inverting input

D) fed back to the noninverting input

174. The Op-amp can amplify

A) a.c. signals only

B) d.c. signals only

C) both a.c. and d.c. signals

D) neither d.c. nor a.c. signals

175. An op-amp can be used as a

A) Inverting and non-inverting amplifier

B) Night switch

C) Comparator

D) All of above

176. In a half-wave rectifier the diode conducts during:

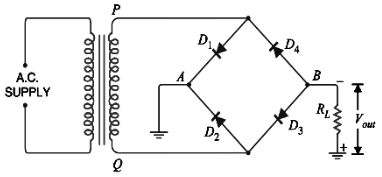
A) Both halves of the input cycle

B) A portion of the positive half of the input cycle

C) A portion of the negative half of the input cycle

D) One half of the input cycle

177. During the positive half-cycle of secondary voltage, the end P of the secondary winding becomes positive and end Q negative, diodes forward biased are



A) D_1 and D_3

B) D_1 and D_4

C) D_2 and D_4

D) All are reversed

178. If $V_- > V_+$ then V_o =

A) V_{CC}

B) $-V_{CC}$

C) $2V_{CC}$

D) None

179. An ideal crystal diode is one which behaves as a perfect …….. when forward biased.

A) conductor

B) resistance material

C) insulator

D) none of the above

180. The example of ductile material is

A) Zirconium, zinc

B) Carbon, steel, glass

C) Lead, copper, wrought iron

D) All